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Short paper: a signal fingerprinting paradigm for general physical layer and sensor network security and assurance

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Description	In this paper, we present a new paradigm for security in conventional networks that has dramatic implications for improving their physical layer network security. We call this paradigm, Detecting Intrusions at Layer ONe (DILON). DILON's enabling hypothesis is that the inherent variability in the construction of digital devices leads to significant variability in their analog signaling. This is true not only for different device models but even for nearly identical devices of the same manufacturing lot. The idea is that by oversampling digital signals to make analog measurements that constitute "voiceprints" of network devices. These form a profile that can be used for detecting MAC address spoofing, reconfiguration of network topologies, and in the long term possibly predict the failure of network devices. This paper discusses historic references and how digital networks enable new approaches as well as a number of applications.
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